

Claims

1. A preparation delivery device comprising a) a container for the preparation having or being prepared for the arrangement of an opening, b) a mechanism operable to deliver at least part of the preparation in the container through the opening, c) attachment means for 5 connection of the container to the mechanism and d) a sensor system arranged to detect at least one predetermined property of the container or its content, characterized in the improvement comprising
a radiation transmitter arranged to irradiate the container position or a part thereof,
a radiation receiver arranged to receive at least an area part of the radiation from the 10 transmitter after the radiation having been affected by the container position and
the receiver being designed to give an output response representative for the total radiation received from said area part.

2. The device of claim 1, characterized in that at least part of the container is translucent or transparent at the radiation frequency.

15 3. The device of claim 1, characterized in that the container is a cartridge comprising a) a generally cylindrical barrel with a general symmetry axis and having a front end and a rear end, b) an opening or a preparation for an opening at its front end, c) at least one displaceable piston inserted in the barrel between the front end and the rear end.

4. The device of claim 3, characterized in that the cartridge is of dual or multi 20 chamber type.

5. The device of claim 1, characterized in that the mechanism includes pump means actuated by electric motor means.

6. The device of claim 1, characterized in that the mechanism includes a control system operable to control at least the electric motor means.

25 7. The device of claim 1, characterized in that the attachment means include movement means operable to move the container in relation to stationary parts of the mechanism.

8. The device of claim 7, characterized in that the movement means include scanning means operable to move the container relative the sensor system.

30 9. The device of claim 8, characterized in that the movement means are also operable to perform an initiation operation on the container.

10. The device of claim 7, characterized in that said movement means are arranged to give a speed of less than 10 cm/sec, preferably less than 1 cm/sec.
11. The device of claim 1, characterized in that the radiation has a wavelength between 300 and 3000 nanometers.
- 5 12. The device of claim 11, characterized in that the radiation is in the non-visible range.
13. The device of claim 12, characterized in that the radiation is in the infrared range.
- 10 14. The device of claim 1, characterized in that the transmitter comprises a light emitting diode.
15. The device of claim 1, characterized in that the receiver comprises a photodiode or a phototransistor.
16. The device of claim 15, characterized in that the receiver comprises a daylight filter.
- 15 17. The device of claim 1, characterized in that the receiver output is non-imaging.
18. The device of claim 1, characterized in that the radiation received is defocused.
19. The device of claim 1, characterized in that the irradiation and reception 20 have space angles above 10 degrees.
20. The device of claim 1, characterized in that the transmitter is arranged to give a divergent beam and the receiver is arranged to have a divergent take up angle.
21. The device of claim 1, characterized in that transmitter and/or receiver are broadbanded with a preferred frequency variation coefficient of at least plus and minus 1 25 percent of nominal frequency.
22. The device of claim 1, characterized in that transmitter and receiver are arranged facing in substantially the same direction.
23. The device of claim 1, characterized in that the transmitter and receiver are arranged at a distance from the container.
- 30 24. The device of claim 1, characterized in that the area covered by the receiver, expressed as the diameter of a circle with corresponding surface, is between 0.5 and 15 mm.

25. The device of claim 1, characterized in that the container has a marking readable by the sensor system.

26. The device of claim 25, characterized in that the marking has more than two discrete levels.

5 27. The device of claim 25, characterized in that the marking has several discrete marking areas.

28. The device of claim 27, characterized in that moving means are present to read the areas in sequence, statically or dynamically.

10 29. The device of claim 25, characterized in that the marking has differences in absorption or reflection.

30. The device of claim 1, characterized in that the relative positioning between sensor and container is adapted to detect a functional property of the container.

15 31. The device of claim 30, characterized in that the functional property is a container contour part, a plunger position, container content or a marking or modification designed to facilitate detection of a functional property.

32. The device of claim 30, characterized in that the relative positioning is adapted to also read a marking on the container, statically or dynamically.

33. The device of claim 1, characterized in that it contains an electronic control unit, preferably a microcontroller.

20 34. The device of claim 33, characterized in that the control unit is operative to receive the modified or unmodified output from the receiver and compare it with one or several memorized characteristics and to act differently if and if not, respectively, a certain similarity is present.

35. The device of claim 34, characterized in that the control unit is operative 25 to receive a response versus time function.

36. The device of claim 34 or 35, characterized in that said acting includes the option of activating electric motor means.

37. The device of claim 1, characterized in that the transmitted radiation is modulated.

30 38. The device of claim 1, characterized in that transmitter and receiver are arranged to have a stable axis orientation in relation to their support.